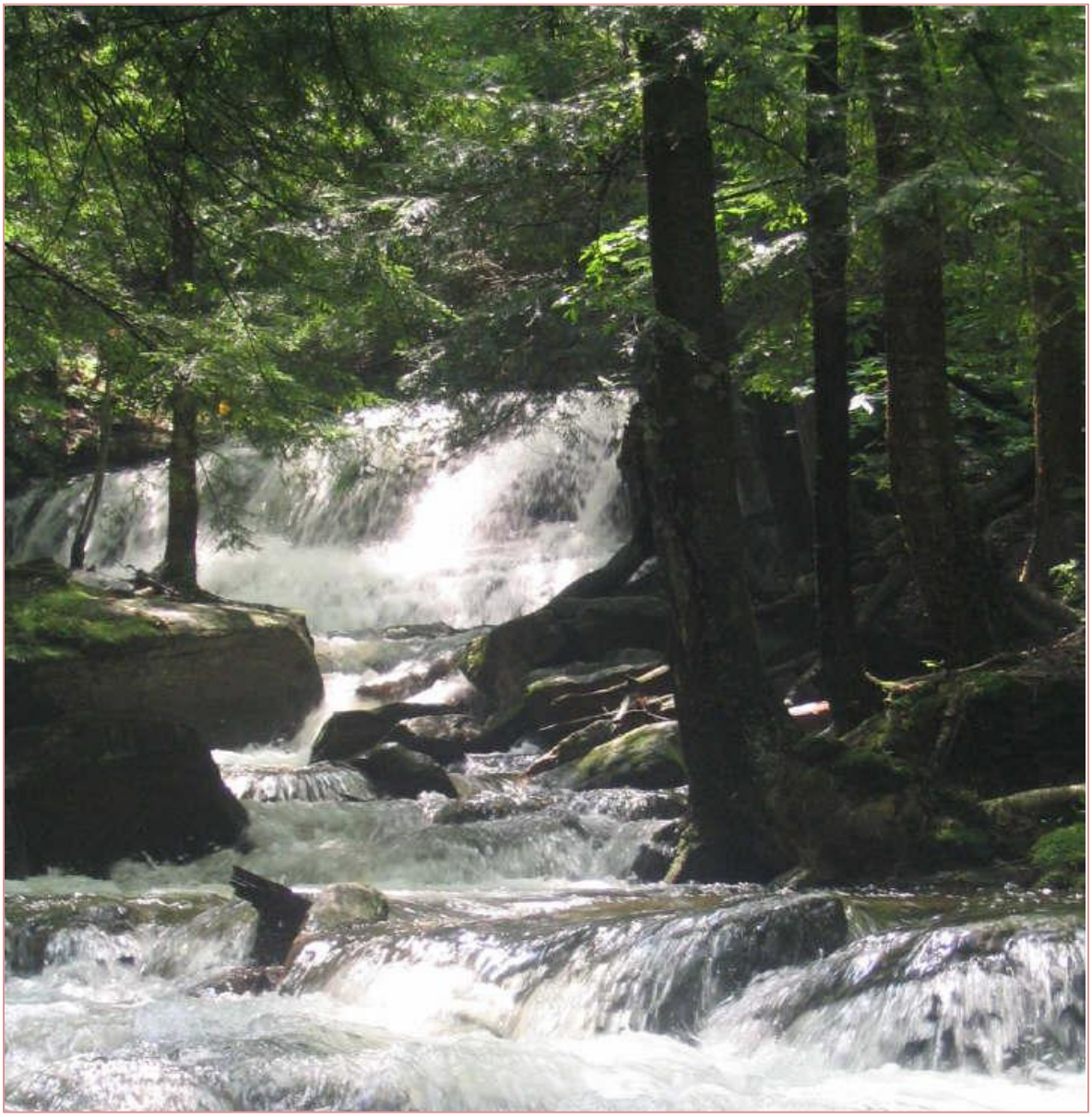
United States Department of Agriculture

Hemlock Woolly Adelgid Suppression
Scoping Document



Forest Service

Allegheny National Forest

Elk, Forest, McKean, and Warren Counties, Pennsylvania

February 2015

Cover photo: Logan Falls, Greg Porter, photographer

Who is Proposing the Project?

The United States Department of Agriculture (USDA), Forest Service, Allegheny National Forest (Forest), is initiating an environmental analysis for the proposed Hemlock Woolly Adelgid Suppression Project pursuant to the National Environmental Policy Act of 1969. The hemlock woolly adelgid (HWA) is a nonnative insect that attacks eastern hemlock (*Tsuga canadensis*) trees. The hemlock woolly adelgid is established on the Allegheny National Forest and infestations in eastern hemlock have been building.

What are We Proposing to Do?

We are proposing to suppress HWA infestations to reduce impacts to important hemlock areas on the Forest. This effort is part of a landscape approach in collaboration with surrounding public and private landowners. Our goal is to treat prioritized, important hemlock areas, in order to best allocate limited treatment resources. Ideally, this will result in a hemlock component retained in featured areas across the landscape to protect valued places and maintain important ecosystem functions. The longer-term objective is to sustain these areas until more effective landscape controls of HWA are discovered.

This project implements the Allegheny National Forest Land and Resource Management Plan (Forest Plan) (USDA 2007) (see the Management Direction section).

The project is subject to pre-decisional objection consistent with the Consolidated Appropriations Act of 2012 (P.L. 112-74) as implemented by subparts A and B of 36 CFR Part 218.

Why are We Proposing to Take Action?

Background Information

Hemlock Importance and Ecology

Eastern hemlock (*Tsuga Canadensis*) is an important component of the Allegheny National Forest and eastern temperate forests, serving as a keystone species, especially in riparian zones (Mladenoff 1987, Quimby 1996, Ellison et al. 2005). Eastern hemlock comprises approximately 7 percent of trees on the Allegheny National Forest. Hemlock is the most abundant conifer on the Forest, and is largely concentrated in ecologically important areas such as riparian zones along streams. It is important for a number of ecological values including: providing thermal cover for wildlife; providing habitat for a number of arthropods, birds, and mammals; providing shade along streams and springs; regulating water temperature and volume; and contributing nutrients to aquatic systems. It is also valued by people for its year-round green foliage, aesthetic and cooling qualities, educational opportunities, spiritual values and overall beauty.

Hemlock Woolly Adelgid

The hemlock woolly adelgid (*Adelges tsugae* Annand) is a tiny nonnative invasive insect that is attacking and killing hemlock trees across Pennsylvania and many eastern states. HWA is native to Japan, and was first observed in the eastern United States near Richmond, Virginia in 1951. HWA was found in Pennsylvania in 1969 and in Maryland in 1973. Since then it has established

itself as a serious pest of hemlock and continues to spread throughout the range of hemlock in the eastern United States. As of 2013, about half of the entire range of eastern hemlock was infested, including the majority of counties in Pennsylvania, and a little over one-third of the counties in New York (Figure 1).

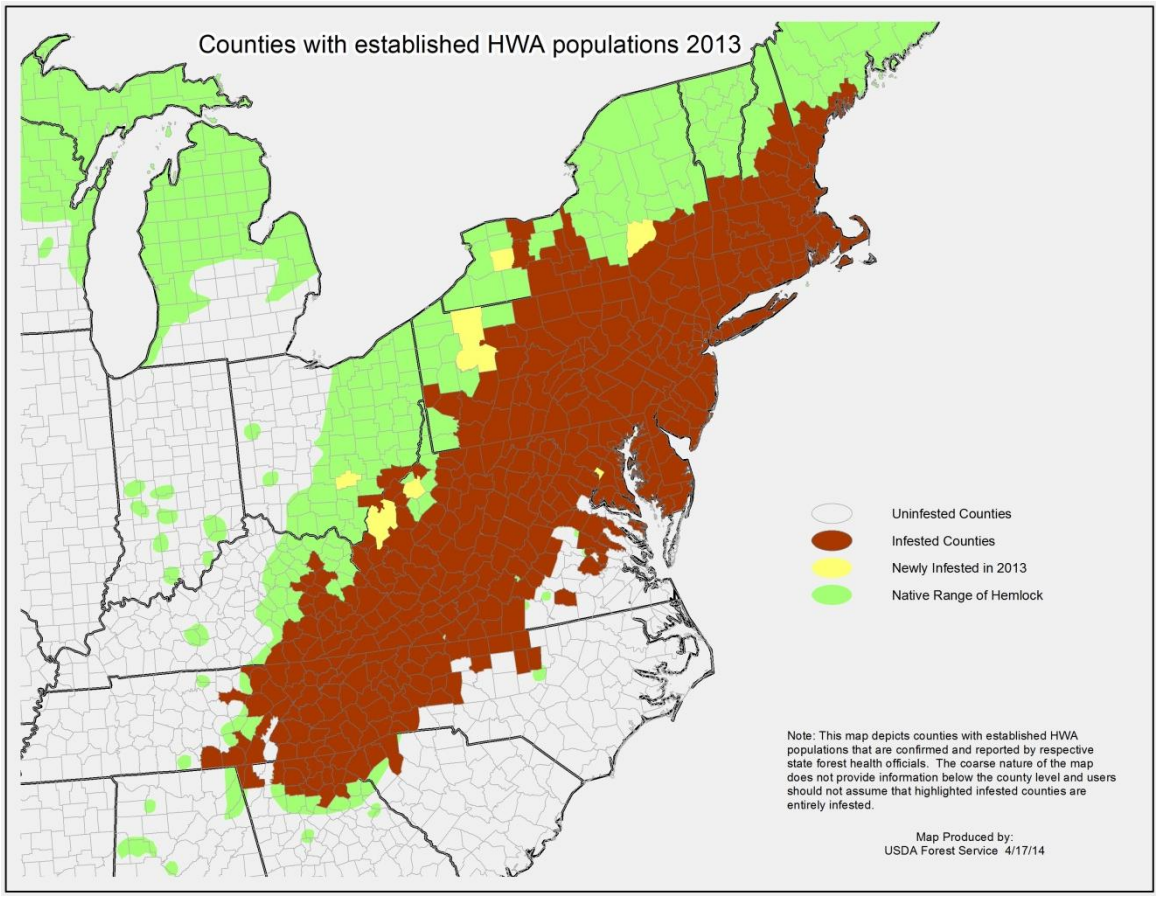


Figure 1. Counties with established hemlock woolly adelgid populations in 2013

HWA in eastern North America reproduces asexually, with two complete generations a year on hemlock. The adelgid itself is less than 1/16th inch, but its presence is visible through the wool-like wax filament it develops to protect itself and its eggs. These filament ("woolly" material) can be readily observed on the underside of the outermost branches of hemlock trees, particularly from late fall to early summer (Figure 2). Upon hatching, adelgid nymphs feed on stored nutrients in the branch at the base of hemlock needles. Depletion of these nutrients causes decline in tree health leading to mortality within 4 to 10 years. Dispersal of HWA occurs by wind, bird, other wildlife, or humans when contact is made with the sticky wool-like filament (USDA Pest Alert 2005). Isolated infestations and long-distance movement of HWA most often occur as the result of people transporting infested nursery stock. References that describe HWA and its lifecycle are available on the web at http://www.invasivespeciesinfo.gov/animals/hwa.shtml.

Figure 2. Hemlock woolly adelgid infested branch (Chris Evans, www.forestryimages.org)

High Allegheny Unglaciated Plateau Collaborative Hemlock Conservation Strategy

In 2012, recognizing that HWA would soon spread to the Allegheny National Forest, the Forest Service and The Nature Conservancy organized a partnership of land owners and managers and other interested groups and organizations to develop a collaborative strategy for landscape-level conservation of the hemlock resource on the High Allegheny Unglaciated Plateau (EPA ecoregion 212Ga). This area encompasses approximately 2.5 million acres that includes the Allegheny National Forest and other ownerships, and extends into New York State.

Within the High Allegheny Unglaciated Plateau, across all collaborating ownerships, the partnership designated 146 areas as priority hemlock conservation areas (HCAs), which contain documented old-growth forest, recreation areas, research areas, important habitat areas, and high water quality streams. This initial collaboration identified approximately 174,000 acres of priority areas on the Allegheny National Forest. Subsequently, Allegheny National Forest staff added additional priority areas that include developed and high use dispersed recreation areas known to contain hemlock, and have better defined hemlock conservation areas based on hemlock distribution.

Maps of hemlock conservation areas for the High Allegheny Unglaciated Plateau collaborative strategy can be located at http://tnc.maps.arcgis.com/home/item.html?id=a7dcd307215c4c0fb77ae7c64378d111.

HWA Infestations on the Allegheny National Forest

Monitoring for HWA has been ongoing on the Allegheny National Forest since 2004. For a number of years, the closest known HWA infestation to the Forest was about 30 miles away, near Benezette, PA at a site where HWA was found in 2005.

In 2013, HWA was first detected on the Forest following discovery in nearby Cook Forest State Park. Hemlock woolly adelgid was likely present but undetected for several years before this. Currently, HWA is known to occur in four geographically separate locations on the Forest. It has been confirmed on the northern and southern borders of the Forest, and at locations in the Forest interior. Based on observations of the high rate of hemlock mortality in eastern Pennsylvania, and nearby states including West Virginia, New York, Kentucky, Virginia, North Carolina, and Tennessee, quick action is needed to initiate control measures to maintain a genetic representation of the eastern hemlock on the Forest and High Allegheny Unglaciated Plateau.

Purpose and Need for Action

Why Here and Why Now?

The long-term goal of this proposal is to maintain valued populations of hemlock throughout much of its historical geographic range across the Allegheny National Forest. The project is also needed to maintain a genetic representation of eastern hemlock to create sources of genetic diversity and potential sources of natural regeneration for future hemlock restoration, should that become necessary.

Hemlock trees and their associated plant communities are an important ecological component of riparian and cove forest ecosystems. Some of the most notable examples of old growth hemlock in Pennsylvania occur on the Allegheny National Forest. Loss of much, if not all of the hemlock component could change the species composition, structure, and function of these areas.

We are concerned that HWA could potentially kill all of the eastern hemlocks across the Forest over the next 50 years. HWA has the potential to infest the entire range of eastern hemlock in the next 30 years. Thirteen years of monitoring HWA in New Jersey indicate tree mortality began within 5 to 6 years after a stand became heavily infested, with more than 90 percent mortality in about 10 to 12 years (Mayer et al. 2002).

This project is designed to limit hemlock mortality from HWA and promote survival of ecologically and culturally important areas of hemlock across the Forest.

How are We Proposing to Take Action?

Proposed Action

The proposed action is to allow chemical and biological control treatments to suppress infestations of the hemlock woolly adelgid in designated areas of the Allegheny National Forest, including in federally designated wilderness areas.

Suppression Treatment Areas

Figure 3 shows proposed suppression treatment areas—HCAs, focal areas, and recreation sites—for hemlock woolly adelgid suppression on the Allegheny National Forest. This section describes these three suppression treatment areas and the identification process.

Hemlock Conservation Areas

We identified 82 hemlock conservation areas (HCAs) across the Allegheny National Forest. Project HCAs are areas that contain a component of hemlock trees with ecological and social/cultural values. Project HCAs total 147,216 acres, and include 6,335 acres within Hickory Creek Wilderness. These 82 HCAs would join a network of hemlock conservation areas that will be managed within the High Allegheny Unglaciated Plateau Cooperative Pest Management Area.

Focal Areas

Within the project HCAs we isolated 220 hemlock focal areas, primarily along streams exhibiting high ecological values. Focal areas identified for biological and chemical treatment of selected individual hemlock trees total 30,160 acres. Focal areas proposed for biological and chemical treatment of individual hemlock trees within the Hickory Creek Wilderness total 1,508 acres.

Recreation Sites

There are 201 recreation sites and facilities proposed for suppression treatments that fall within and outside the project HCAs. Recreation site individual hemlock tree treatment areas total 4,422 acres. Within Hickory Creek Wilderness, biological and chemical treatments are proposed on individual trees within 25 acres along the boundary of Hearts Content Campground.

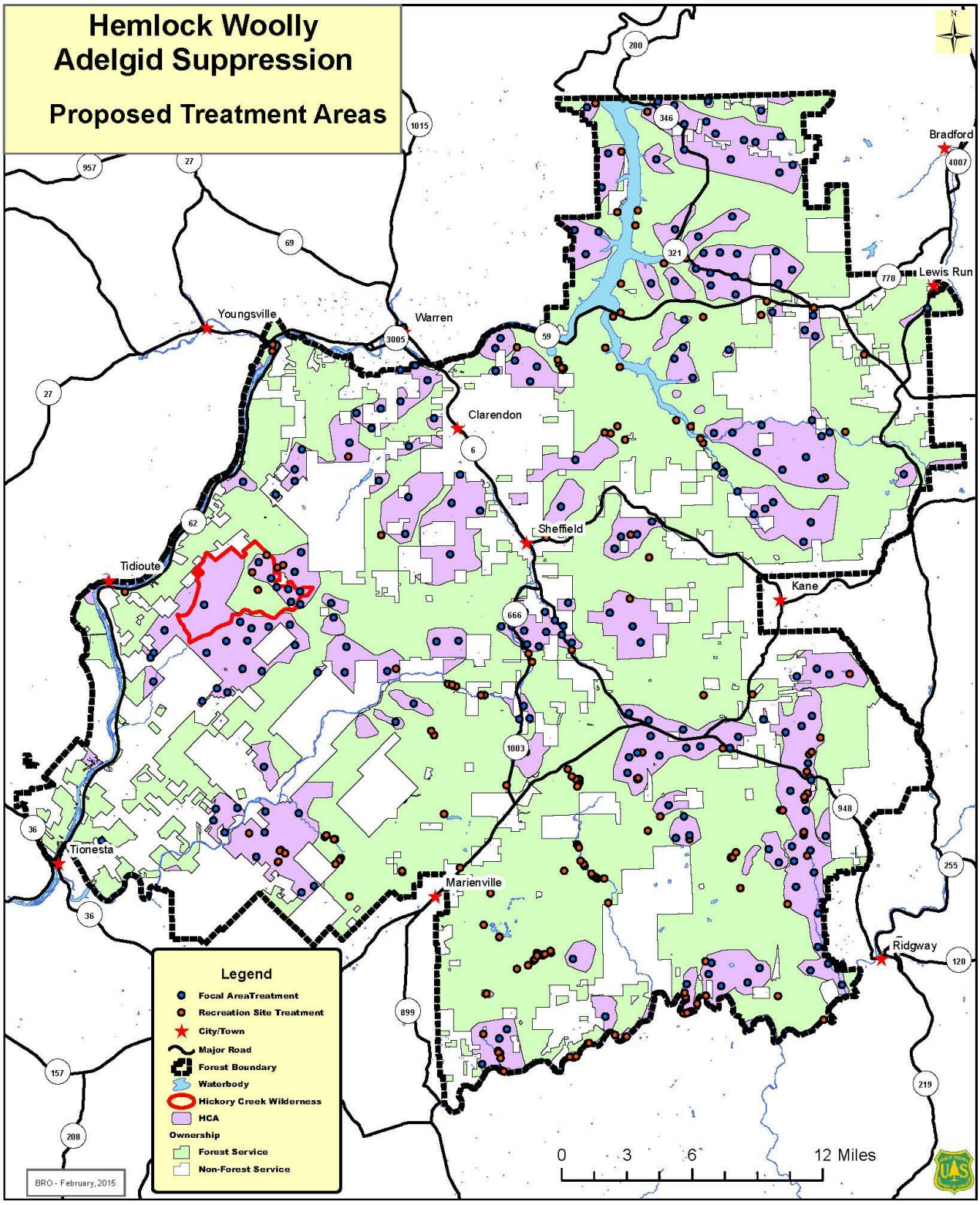


Figure 3. Proposed treatment areas for hemlock woolly adelgid suppression on the Allegheny National Forest

Suppression Treatments

Systemic Insecticides (chemical suppression)

Chemical control is proposed using the chemicals imidacloprid and or dinotefuran. Treatment of individual hemlocks with a systemic insecticide would kill HWA feeding on those trees, allowing the trees to recover from the attack (Webb, Frank and Raupp 2003). A system insecticide is one that is soluble in water and can be absorbed by a plant and transported in its sap.

Chemical treatment applied to groups of infested hemlocks within suppression treatment areas would normally be the systemic insecticide imidacloprid injected into the soil around the base of the tree as a concentrated solution or a tablet. One treatment of imidacloprid can be effective for seven years or more (Cowles 2009). Treatments would be repeated after effectiveness declines or if evidence of repeated infestation occurs. Treatment would cease when effective biological control agents become established or the HWA threat is otherwise diminished, based on annual situation reports from Forest Health Protection.

Imidacloprid may also be applied as a soil drench around individual hemlock trees, or injected into individual hemlock trunks. Soil drench applies a solution of imidacloprid and water to the soil surface near the base of the tree. This application method involves transport of water to the site by means of trucks or ATVs, and would tend to be used in treating isolated high-value hemlocks located near access roads. Direct stem injection of imidacloprid would be used near water bodies in areas of wet or highly permeable soils, to reduce potential impacts on aquatic and terrestrial organisms.

In addition to imidacloprid, heavily infested large-diameter hemlock trees could have an application of dinotefuran (Safari®) applied directly to the bark of the tree at its base. Dinotefuran treatment has greater mobility within the hemlock and is more quickly effective, but its efficacy is shorter-lived than imidacloprid. The strategy is to treat the trees in greatest need with dinotefuran so that HWA would be rapidly suppressed, allowing them to recover to the point that they would be able to uptake the slower moving, but longer lasting imidacloprid.

Chemical control would be focused within focal areas and recreation sites. Any pesticides used in this project would be registered by the Environmental Protection Agency in full accordance with the Federal Insecticide, Fungicide, Rodenticide Act, as amended. Pesticide use would follow all E.P.A. and Commonwealth of Pennsylvania pesticide application regulations and Forest Service handbook and manual direction.

Biological Control

Biological control treatment would feature the release of organisms that specifically target HWA, and have little to no effect on other organisms. The proposed action includes the release and establishment of HWA predatory beetles as part of an integrated pest management strategy.

Several predatory beetles have been released against HWA in the eastern United States, including *Sasajiscymnus tsugae, Laricobius nigrinus*, and *Scymnus sinuanodulus*. Other beetles currently being evaluated are *Scymnus ningshanensis, Scymnus coniferarum*, *Scymnus camptodromus,* and *Laricobius osakensis,* all of which show promise as biological control agents. Each beetle has its own unique dispersal habits, reproductive potential, feeding behavior, and suitable climate regimes. Beetles are generally released in infested hemlock stands found along the leading edge of the infestation, or in areas where hemlocks are still healthy and HWA densities have not yet

overcome the trees. The predator beetles are expected to take several years to establish reproducing populations.

Biological control would be focused within the broad HCAs. Each HCA would be prioritized for biocontrol based on criteria such as degree of HWA infestation and the health of the trees. Biological control agents would meet USDA risk assessment criteria for release (Hennessey 1995, Zilahi-Balogh G.M.G. 2001, Montgomery et al. 1997, Lu and Montgomery 2001, Butin et al. 2002).

Integrated Pest Management

Integration of chemical and biological control on an area-wide scale may help save some hemlocks that otherwise would not survive in the long term by any one control method used alone. The concept currently being advocated involves the chemical treatment of a subset of mature infested hemlock while releasing predators where there is sufficient HWA present to support rapid population growth of the beetles. The chemical treatment could provide short-term protection for the selected trees and allow the predator populations to build up in nearby areas. Once the chemically treated trees lose their chemical protection, an established predator population might be more capable of controlling an increasing HWA population.

These kinds of integrated approaches would continue to be evaluated while new management tools are developed for HWA control. This long-term adaptive approach would likely require a complex of natural enemies to maintain HWA below damaging levels. Other emerging federally and state-approved bio-controls would also be considered for future use in the project area following the required environmental review process.

Management Direction

The Forest Plan provides a programmatic framework regarding allocation of National Forest System lands and the measures necessary to protect resources. It describes how the Allegheny National Forest should be managed and what resources should be provided by these lands now and into the future. The Forest Plan provides a vision (Forest Plan pp. 7-16) that includes sustaining hemlock and other conifer species on the Allegheny National Forest to provide important ecosystem values such as thermal cover and stream shade.

Proposed activities are consistent with management direction in the Forest Plan. Specifically, the proposed action addresses the following Forest Plan goals (Forest Plan pp. 12-16):

- Strive to preserve natural patterns of genetic variation in native species such as hemlocks, by avoiding loss of genetically unique populations in the face of threats from nonnative invasive species such as hemlock woolly adelgid.
- Maintain or enhance the quality of scenic resources including viewsheds, vistas, overlooks and special features.
- Provide a diversity of vegetation patterns across the landscape that represents well-distributed habitats, a range of forest age classes and vegetative stages, a variety of healthy functioning vegetation layers, moderate to well stocked forest cover, and the variety of vegetation species or forest types necessary to achieve multiple resource objectives and sustain forest health.
- Provide riparian areas that have dynamic vegetative communities that promote floodplain structure, stream channel stability, aquatic diversity, natural recruitment of large woody debris and other sources of organics.

- Provide riparian areas that are occupied by vegetation that provides habitat for riparian-dependent species.
- Contribute to the conservation and enhancement of habitat integrity for species with viability concerns by protecting specific habitat elements crucial to the long-term sustainability of the species.
- Maintain and enhance distribution and diversity of plant and animal species by providing a diversity of high quality habitats across the landscape.
- Provide habitat for game species to make opportunities available for quality hunting and fishing experiences.
- Emphasize integrated pest management methods to prevent or minimize pest problems by using the most current science and available control methods, including silvicultural treatments, maintaining species diversity, pesticide application, and introduction of insect predators or parasites.
- Provide for safe, effective, pesticide and insecticide use when needed as part of an integrated pest management strategy.

Forest Plan standards for forest pest management allow insect and disease control to protect health and safety, adjacent land values, and heritage assets, and support integrated pest management methods used to minimize or prevent development of pest problems (Forest Plan p. 94). Guidelines promote development of a strategy based on the most current treatment options, infestation levels, and prioritization of treatment areas at such time the hemlock woolly adelgid is discovered on the Allegheny National Forest (Forest Plan p. 93).

Pesticides, including chemical and biological controls, are permitted in all management areas when needed as part of an integrated pest management strategy to address forest health issues (Forest Plan p. 35). Forest Plan management direction related to pesticide use can be found in the Forest Plan on pages 54-59, 93-94, and A-3 to A-4.

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